

NON-PUBLIC?: N  
ACCESSION #: 8905150311  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Millstone Nuclear Power Station Unit 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000336

TITLE: Loss of Normal Power Due to a 4160 Volt Bus Fault  
EVENT DATE: 10/25/88 LER #: 88-011-01 REPORT DATE: 05/04/89

OPERATING MODE: POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Hamid Mahdavy, Engineer x4460 TELEPHONE: (203)447-1791

COMPONENT FAILURE DESCRIPTION:  
CAUSE: A SYSTEM: EB COMPONENT: GCON MANUFACTURER: G080  
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: YES EXPECTED SUBMISSION DATE:  
05/01/89

ABSTRACT:

On October 25, 1988 at 0719 hours with the plant in Mode 1 at 100 percent power, a loss of normal power (LNP) on both 4160 volt vital AC buses caused a reactor trip and ESF actuation. As designed, all loads were shed from both safety buses, both emergency diesels automatically started and all safe shutdown loads were sequenced onto the diesel powered safety buses. The plant functioned as expected during the reactor trip and subsequent plant recovery.

The event occurred while unit electrical maintenance personnel were preparing to remove the Facility Z2 Service Water pump motor from service for preventive maintenance. The event was caused by personnel error when workers improperly connected a grounding device to the "BUS" side of the 4160 volt breaker compartment in bus 24D, causing a symmetrical three phase fault. The fault cleared when the feeder breakers to the bus were opened and the bus was de-energized.

Immediate action was taken to verify all equipment was responding as required and the plant was in a safe condition.

END OF ABSTRACT

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#### I. Description of Event

On October 25, 1988 at 0719 hours with the plant in Mode 1 at 100 percent power, a loss of normal power (LNP) on both 4160 volt vital AC buses caused a reactor trip and ESF actuation. As designed, all loads were shed from both safety buses, both emergency diesels automatically started and all safe shutdown loads were sequenced onto the diesel powered safety buses. The plant functioned as expected during the reactor trip and subsequent plant recovery. Plant operators complied with all Emergency Plant Procedures in response to a Reactor trip and loss of normal power.

Maintenance personnel were in the process of installing workman's grounds on the "C" service water pump motor in preparation for performing preventive maintenance. This is accomplished by installing a "ground and test device" (GTD) in the breaker cubicle. This will temporarily ground the motor until a "workman's ground" is attached. The ground is for personnel protection against electrical shock. The transient occurred after maintenance had verified that the motor was de-energized, using a test GTD, and then re-inserting a GTD that was of the type used for grounding the BUS not the LOAD (Motor). The cause of the event was a combination of two personnel errors. The assisting plant equipment operator selected the wrong GTD because he was not aware of the differences in GTDs. The electrician then inserted the GTD because he failed to recognize that it was the wrong GTD.

The subsequent fault initiated the following sequence:

Severe drop of voltage on all 4160 volt distribution buses, This undervoltage was detected by the ESF system which started both diesel generators, stripped all loads from the 24C and 24D vital buses and opened feeder tie breakers to the above buses.

The fault cleared after the feeder breakers supplying power to the 24D Bus opened. Sufficient burning and melting away of material at the point of contact prevented the fault from re-occurring upon energization of the bus by the Diesel Generator.

Load shedding of the 24C and 24D buses caused de-energization of the unit's two control rod drive motor-generator (M-G) sets which in turn activated a turbine trip on M-G set output undervoltage.

A reactor trip signal was processed by the reactor protection system upon detection of turbine trip.

All equipment operated as expected in response to the event and due to strict adherence to safe work practices no personnel injuries occurred,

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## II. Cause of Event

The root cause of the event was personnel error. The individual staging the GTD selected the wrong device as he was not aware of the difference between bus and line grounding GTDs and the electrician who installed the GTD failed to recognize and correct this error.

The GTD is a device that is installed in a medium voltage switchgear cubicle in lieu of the breaker mechanism. The device when racked into position can either act as a grounding device for the bus / load or provide an access terminal to the bus / load for testing purposes. The orientation of the GTD stabs determines if the connection is to the bus or to the load. These stab positions are labeled "bus" for connection to the bus and "line" for connection to the load.

## III. Analysis of Event

This report is being submitted pursuant to 10CFR paragraph 50.73 (a) (2) (iv) to describe an event that resulted in the automatic actuation of an Engineered Safety Features system. There were no safety consequences as a result of this event. All plant equipment performed per design and plant operators executed applicable Emergency Operating Procedures accordingly.

## IV. Corrective Action

Immediate action was taken to assure all plant equipment had functioned properly and the plant was in a safe condition. Additional action was taken by plant personnel to identify the cause of the fault and assure the GTD had been removed from the breaker cubicle to prevent further faulting.

Subsequent actions include:

The procedure will be re-written to assure the proper use of ground and test devices.

Setpoint and operability verification of the two feeder breaker protective relays that may have been subject to the fault current.

A high potential DC insulation resistance test for all cables subject to the fault current.

Disassembly and visual inspection of the switchgear cubicle and busbars by the vendor(GE).

A ductor test between busbar connections on 24D where the fault initiated.

A transformer oil test on the normal station service transformer to verify no transformer damage had occurred.

Additional training for maintenance and operations personnel in the proper use of grounding devices.

Evaluating different grounding methods to possibly eliminate the need for this type of ground and test device.

An engineering evaluation of the breaker coordination and bus protective relaying for the 4160 vital buses had been performed in 1985 in response to INPO/NSAC SER 56-81. At that time it had been determined that the protective relay scheme was configured conservatively and no modifications were required. In view of the event described in this LER, the bases for fault protection and breaker coordination were re-evaluated and the conclusion remains that all bus protective functions are coordinated properly and no modification is necessary.

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The breaker cubicle disconnects were damaged beyond repair. Replacement disconnects have been procured from the OEM. The damaged equipment has been removed from the breaker cubicle and new replacements have been installed. The Bus, breaker cubicle and its associated load have been tested and are operational.

The incident was discussed with the electricians involved as well as additional maintenance personnel. It was deemed that the incident was caused by a lapse in judgment and was an isolated case.

Based on these tests and evaluations it was determined that except for the localized damage to the breaker cubicle no other plant component was damaged and the subject equipment was capable of continued operation and performing its intended function.

No further corrective action is necessary.

## V. Additional Information

### Breaker/Bus information

Manufacturer : General Electric

Model number : AM-350

Rating : 4160 Volts/ 2000 Amps

EIIS: EB-52-G080

EB-BU-G080

### Ground and Test Device Information

Manufacturer : General Electric

Model Number : GV-4.16-250

Rating : 5 kv, 1200/2000 Amps

EIIS : EB-GCON-G080

### ADDITIONAL EIIS INFORMATION

EB-51-G080 RELAY, AC TIME OVERCURRENT

JE-XC-C560 ESAS CABINET

JC-XC-C490 PLANT PROTECTION CABINET

EK-DG-F010 EMERGENCY ON-SITE POWER SUPPLY

BA-27-C490 UNDERVOLTAGE RELAY, MOTOR GENERATOR SET CONTROL  
ROD DRIVE SYSTEM

EB-CBL2-K080 CABLE, MEDIUM VOLTAGE

TG-63-G080 SWITCH, PRESSURE TURBINE ELECTROHYDRAULIC HEADER

Similar LERs: None

ATTACHMENT 1 TO 8905150311 PAGE 1 OF 1

NORTHEAST UTILITIES General Offices - Selden Street, Berlin Connecticut  
The Connecticut Light And Power Company  
Western Massachusetts Electric Company  
Holyoke Water Power Company P. O. BOX 270  
Northeast Utilities Service Company HARTFORD, CONNECTICUT 06414-0270  
Northeast Nuclear Energy Company (203)665-5000

May 4, 1989  
MP-13042  
Re: 10CFR50.73(a)(2)(iv)

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Reference: Facility Operating License No. DPR-65  
Docket No. 50-336  
Licensee Event Report 88-011-01

Gentlemen:

This letter forwards update Licensee Event Report 88-011-01 required to be submitted pursuant to paragraph 50.73(a)(2)(iv), for automatic actuation of an Engineered Safety Features system. This update report is submitted to reflect completion of the outstanding corrective action.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: Stephen E. Scace  
Station Superintendent  
Millstone Nuclear Power Station

BY: Harry Haynes  
Station Services Superintendent  
Millstone Nuclear Power Station

SES/HM:tjp/mo

Attachment: LER 88-011-01

cc: W. T. Russell, Region I  
W. J. Raymond, Senior Resident Inspector

\*\*\* END OF DOCUMENT \*\*\*

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